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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,311	01/18/2006	Barbara Hildegard Pause		7382

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EXAMINER	
STEELE, JENNIFER A	

ART UNIT	PAPER NUMBER
1782	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,311	PAUSE, BARBARA HILDEGARD	
	Examiner	Art Unit	
	JENNIFER STEELE	1782	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/25/2010 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claim 1, 2-12 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

   a. Claim 1 was amended to recite the limitation of a “non-crosslinking" phase change material. A “non-crosslinking” phase change material was not disclosed in the original specification and is new subject matter.

   b. Claim 1 was amended to recite the limitation of a crosslinking agent cross-links “the elastomeric material around” the phase change material. The structure

where the crosslinking agent cross-links the elastomeric material around the phase change material was not described in the original specification and is new subject matter.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claim 1, 3-9 and 11-12 rejected under 35 U.S.C. 103(a) as obvious over Worley (US 2003/0054141) in view of Zuckerman et al (US 6,660,667) and Holdridge (US 4,462,390). Claim 1 describes a membrane material for fabric structures having enhanced reversible thermal properties, said membrane comprising a

- Basic woven fabric which is coated continuously at least on one side with
- a polymeric compound consisting of
    - an elastomeric material and

- at least one non-cross-linking phase change material and
- a cross-linking agent
    - whereby the phase change material is first melted into a liquid and mixed into a liquid component of the elastomeric material
    - and then the cross-linking agent is added to the mixture which is applied to the basic woven fabric by knife coating and cured there
    - whereby the cross-linking agent cross-links the elastomeric material around the phase change material while in its liquid stage to incorporate the phase change material in the structure of the elastomeric material
    - and said membrane material becomes more translucent when the phase change changes from its solid into its liquid stage during absorptions of latent heat which also reduces the heat flux through the membrane material into the fabric

Worley teaches a coated article having reverse enhanced thermal properties (ABST).

Worley teaches the article can be a woven fabric [0016].

Worley teaches continuous coatings containing phase change materials are applied to fabrics [0003]. Worley teaches the polymeric coating material can be a thermoplastic polymer or mixture of thermoplastic polymer [0046] that include polyamides, polyurethanes, rubbers such as polybutadiene, polyisoprene, polyesters, polyolefins, polystyrenes, silicon containing polymers such as polydimethyl siloxane,

polycarbomethyl silane, polyfluorocarbons that are known in the art to be elastomeric [0048]. Polybutadiene, polyisoprene and silicon polymers are known in the art to be elastomeric. The current Application teaches in paragraph [0030] of the specification that the elastomeric materials can comprise silicone rubber, acrylate rubber, butyl rubber, nitrile rubber or chloroprene rubber and thermoplastic elastomers with fluorine, polyurethane or polyester as basic components are suitable. Therefore the polymers of the Worley are equated with the polymers of the current application.

Worley teaches that depending on the particular application the coating may comprise one or more additives including cross-linkers such as peroxides and azo compounds [0050]. Worley further teaches that a polymer comprising a polymeric phase change material may be capable of cross-linking, entanglement or hydrogen bonding in order increase its toughness or its resistance to heat, moisture or chemicals [0038]. This teaching is equated with Applicant's claim limitation "whereby the cross-linking agent cross-links the elastomeric material around the phase change material to incorporate the phase change material in the structure of the elastomeric material"

Worley teaches embodiments where the coated article may be manufactured such that the phase change materials are mixed with the polymers to form a blend and embodiments where the monomers or low molecular weight polymers may be initially provided (in the blend) which upon curing, drying or cross-linking are converted to a polymeric material having the desired molecular weight or chain structure [0052]. Worley continues to teach that after the blend has been applied to the substrate, the

blend may be cross-linked to form a coating covering the substrate [0058]. Worley is silent with respect to the state of the PCM when it is mixed into the liquid polymer blend.

Worley differs and does not state that the PCM is in a liquid state when mixed with the polymer blend. The claim limitation that the PCM is in a liquid state prior to mixing is a process limitation. It should be noted that even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same or an obvious variant from a product of the prior art, the claim is unpatentable even though a different process made the prior product. In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985). The burden has been shifted to the Applicant to show unobvious differences between the claimed product and the prior art product. In re Marosi, 218 USPQ 289,292 (Fed. Cir. 1983).

Worley differs from the current application and does not teach that the coated fabric changes in translucency when the PCM changes from a solid into its liquid state during absorption of heat.

Holdridge is directed to a modular solar greenhouse with elevated overhead heat storage material. Holdrige teaches the heat storage material is a phase change material. Holdridge teaches that PCM's change state from liquid to solid when absorbing and releasing heat. And Holdridge teaches that the translucency also changes when the PCM changes state from liquid to solid state (Holdridge, col. 6, lines

15-25). Holdridge teaches the preferred thermal storage materials are polyethylene glycol as a PCM (col. 8, lines 7-21).

It would have been obvious to one of ordinary skill in the art to employ a PCM in a polymeric coating motivated to produce a fabric that would change in translucency when the PCM absorbs and releases heat.

Worley differs and teaches embodiments that are discontinuous coatings. Worley is directed to a directed to a discontinuous coating that will provide more flexibility, softness, air permeability and water vapor transmission. However Worley teaches that prior art continuous coatings are known to incorporate phase change materials to provide enhanced reversible thermal properties [0003].

Zuckerman teaches a fabric coating containing microencapsulated PCM of paraffinic hydrocarbons. The PCM microspheres are mixed in a solution of water, a surfactant, a dispersant, an antifoam agent and a polymer mixture. The mixtures are then applied to the fabric. The coating is continuous as shown in Fig. 1 where layer 12 is the polymer coating with PCM microspheres incorporated into the coating.

It would have been obvious to one of ordinary skill in the art to employ the coating composition of Worley as a continuous coating.

Worley's embodiments and disclosure encompasses the claimed materials of an elastomeric polymer mixed with a PCM and a crosslinking agent. It is also reasonable to presume that the claimed property of translucency would be inherent to the structure of Worley. The inherency of the translucent property is further evidenced in the teaching of Holdridge.

The burden is on the Applicant to show that the claimed process limitation of mixing a liquid PCM would produce a coating that is structurally different from Worley. Based on the claims, it is not clear if a solid PCM versus a liquid PCM was cross-linked into the coating that the resulting structure is different. The structure could be an elastomer cross-linked around a PCM and or an elastomer cross-linked to a PCM, or a copolymer. Applicant can also produce evidence that the claimed property of translucency is unexpected and that the disclosure of Worley does not produce the claimed property.

As to claim 3 and 4, Worley teaches embodiments that have the coating covering one surface and Worley teaches alternatively or in conjunction, the coating can cover one or more surfaces of the substrate and that includes a bottom and a side surface in addition to the top surface [0017].

With regards to claim 5, Worley teaches the coating may be made with the phase change materials uniformly dispersed within the coating or depending on the particular characteristics, the phase change material can be varied within one or more portions of the coating. As Worley is teaching a coated substrate that can be coated on all surfaces and some of the surfaces may not contain the phase change materials, Worley anticipates the membrane material that has a coating on one side that does not contain a phase change material.

As to claim 6, Worley teaches the hydrocarbon compounds of n-Heneicosane, n-Eicosane, n-Nonadecane, n-Octadecane and N-Heptadecane [0037] as disclosed in Applicant's specification as being crystalline alkyl hydrocarbons.

Regarding claim 7, Worley teaches a phase change material can be a hydrated salt [0035].

As to claim 8, Worley teaches the percentage of phase change material in the coating can be up to 25%, 50%, 90% and 100% [0032].

With respect to claim 9, Worley teaches phase change materials with melting points of 22°C to 40°C [0036].

Regarding claim 11, Worley teaches fire retardants can be added to the phase change coating [0050].

As to claim 12, Worley differs and does not teach the coating or fabric has the property of being translucent and the translucency changes in connection with a phase transition of the phase change material.

Holdridge is directed to a modular solar greenhouse with elevated overhead heat storage material. Holdrige teaches the heat storage material is a phase change material. Holdridge teaches that PCM's change state from liquid to solid when absorbing and releasing heat. And Holdridge teaches that the translucency also changes when the PCM changes state from liquid to solid state (Holdridge, col. 6, lines 15-25). Holdridge teaches the preferred thermal storage materials are polyethylene glycol as a PCM (col. 8, lines 7-21).

It would have been obvious to one of ordinary skill in the art to employ a PCM in a polymeric coating motivated to produce a fabric that would change in translucency when the PCM absorbs and releases heat.

2. Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Worley (US 2003/0054141) in view of Salyer (US 4,797,160) and Zuckerman et al (US 6,660,667). Worley differs from the current application and does not teach the latent heat storage capacity of the phase change article. Salyer teaches phase change materials for use in building materials (ABST). Salyer teaches phase change materials of microcystalline waxes such as hexadecane (col. 3, lines 5-10). Salyer teaches phase change materials with a heat storage capacity of 30-50 cal/gm. Zuckerman teaches a coating composition for fabrics of wetted microspheres containing phase change materials that include paraffinic hydrocarbons (ABST). Zuckerman teaches the coating can contain 54% phase change microspheres (col. 9, lines 33-45). Zuckerman teaches the coating has a weight per unit area of 270 gsm (col. 10, lines 33). Zuckerman does not disclose the heat storage capacity. However if both Zuckerman and Salyer employ the same phase change materials and composition as the current Application, the heat storage capacity in the units of kJ/m^2 can be calculated by the heat capacity of 50 cal/gm multiplied by the density of 270 gsm to obtain a heat storage capacity of 13,770 cal/ m^2. Converting calories to kJoules results in a heat storage capacity of 57 kJ/m^2 and in the range of up to 150 kJ/m^2 as claimed.

Response to Arguments

3. Applicant's amendments and arguments filed 2/25/2010 have been fully considered but they are not persuasive. Applicant's amendments introduce new subject

matter that was not taught in the original specification and therefore has been rejected over 35 USC 112 1st paragraph.

4. Applicant's arguments state that phase change materials have to be applied to the system while in their liquid stage in order to occupy the maximum possible space within the structure and if the PCM were to be applied in solid stage, the cross-linked structure around them would later be ruptured due to the expansion in volume when melting into a liquid. This scientific explanation that there is a difference in the final article structure when the PCM is incorporated in a liquid state versus a solid state presents a reasonable argument that the final structure of the present invention is different from Worley, however the evidence should be submitted in the form of a Rule 1.132 Declaration as evidence of this fact. And/or Applicant could submit evidence in the form of a Rule 1.132 Declaration with a side by side comparison of a process of producing the membrane coating with a solid PCM versus the process of producing the membrane coating with a liquid PCM to in fact show that the final structures are different and possess the unexpected property of becoming more translucent when the phase change material changes from solid to liquid during heat absorption.

5. Applicant argues that Worley teaches the polymer may be capable of cross-linking in order to increase its toughness or its resistance to heat, moisture and chemicals but Worley does not teach that the cross-linking feature is used to embed the phase change material into the polymer structure and to prevent the dissolution of phase change materials while in its liquid state in this way. Examiner agrees that Worley is silent with respect to the state of the PCM when incorporated into monomers

that are then cross-linked to form the coating. By nature, the PCM's change state from solid to liquid when absorbing heat and releasing heat and it is not clear that starting with the liquid form versus starting with the solid form of a PCM would change the final structure of the coating recognizing that when in use, the PCM is naturally going to change state within the coating structure. In the absence of support in the specification or evidence in the form or of a Rule 1.132 Declaration stating that incorporating the PCM in the liquid state versus the solid state produces a final structure that is different from Worley, the rejection over Worley is maintained.

6. Applicant argues that Worley teaches separate containment structures that encapsulate, contain, surround, absorb or react with the PCM and this containment structure may serve to reduce or prevent leakage of the PCM from the coated article during end use (0043). The present application no separate containment structure is used in addition to the polymer. As claimed the structure of the elastomeric polymer contains the PCM.

7. Applicant states that in the art of the present application, cross-linking the elastomeric material around the phase change material does not lead to the changes in the molecular weight of the chain structure of the elastomeric material taught by Worley (0052). This argument is not commensurate with the scope of the claims. The claims do not recite there is no change in molecular weight of the chain structure. If this feature is novel to the invention, Applicant can submit evidence in the form of Rule 1.132 Declaration to show the differences between Worley and the present invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER STEELE whose telephone number is (571)272-7115. The examiner can normally be reached on Office Hours Mon-Fri 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on (571) 272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. S./
Examiner, Art Unit 1782

4/20/2010

/Rena L. Dye/
Supervisory Patent Examiner, Art Unit 1782